



# **Armed Forces College of Medicine AFCM**



# **Accessory Glands in Male Genital System**

**Prof. Dr. Manal Hassan  
Moussa**

# INTENDED LEARNING OBJECTIVES (ILO)



By the end of this lecture the student will be able to:

- 1. Describe the microscopic structure (LM & EM) of the male accessory genital glands and penis.**
- 2. Correlate the microscopic structure of the male accessory genital glands and penis to their functions.**
- 3. Interpret the histological changes in the prostate in various diseases**
- 4. Describe the structure of the different areas of male urethra**

# Lecture Plan



1. Part 1 (5 min)
2. Part 2 (35 min)
3. Part 3 (5 min)
4. Lecture Quiz (5 min)

# Male reproductive system



1- **Testis** (sperms & testosterone)

2- **Duct System**

1- Straight tubules

2- Rete testis

3- Efferent ductules

4- Epididymis

5- Vas deferens

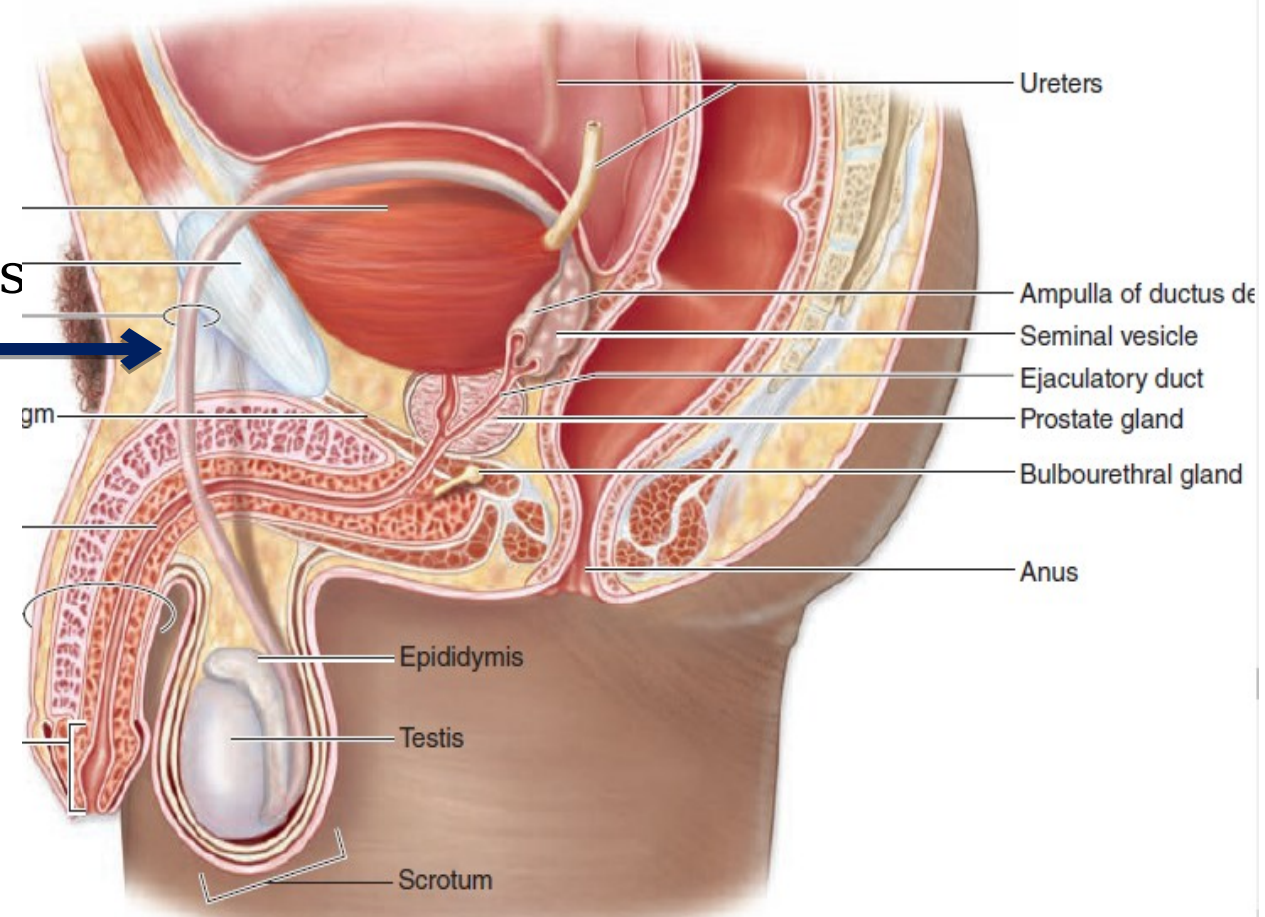
3- **Accessory organs**

1- Prostate

2- Seminal vesicles

3- Bulbourethral gland

4- **Penis**





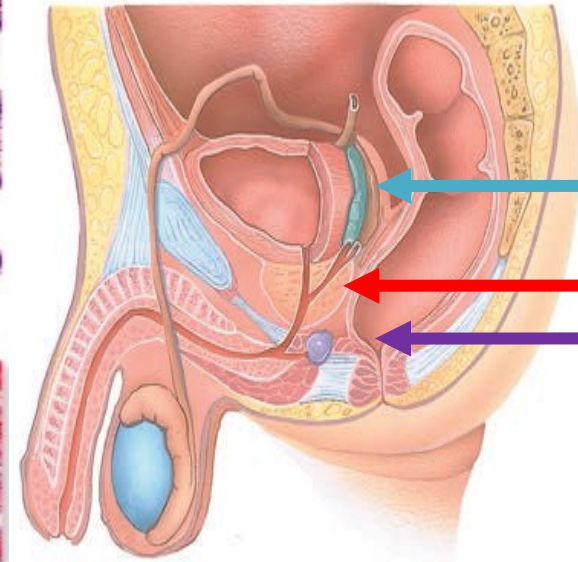
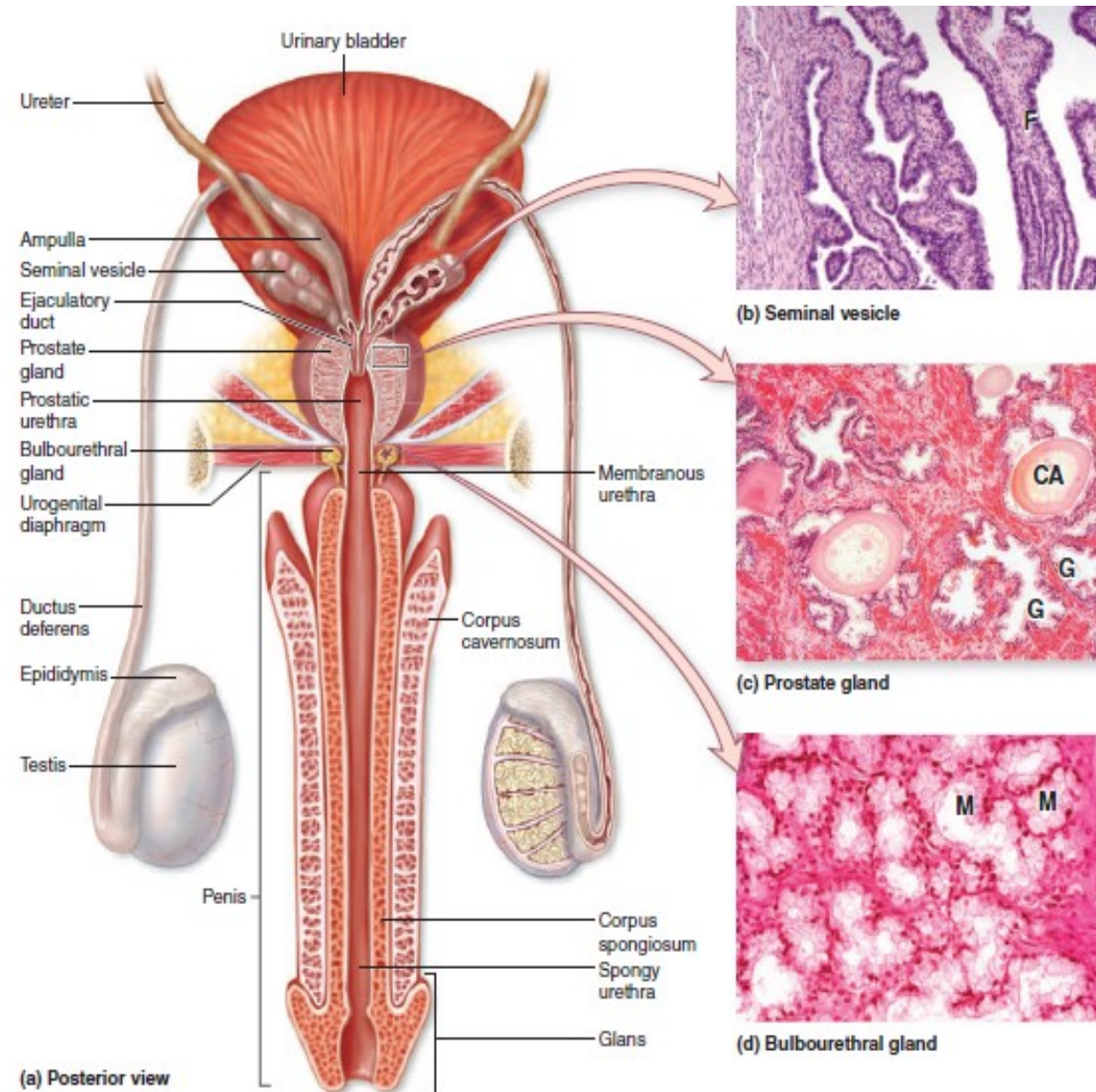
# Accessory glands of male reproductive system



1- **Seminal vesicles**

2- **Prostatic gland**

3- **Bulbourethral (Cowper's) glands**

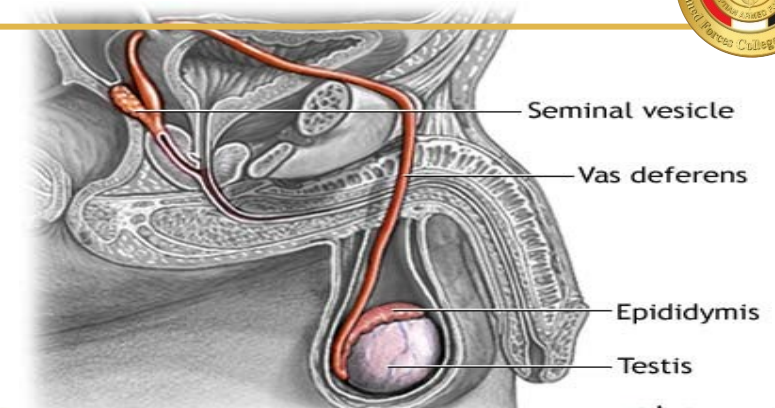


# Seminal vesicles



Number: Paired glands

Shape: **highly coiled** (convoluted) tube.



The wall is formed of:- **Mucosa**

**2- Muscle layer**

**3- Adventitia**

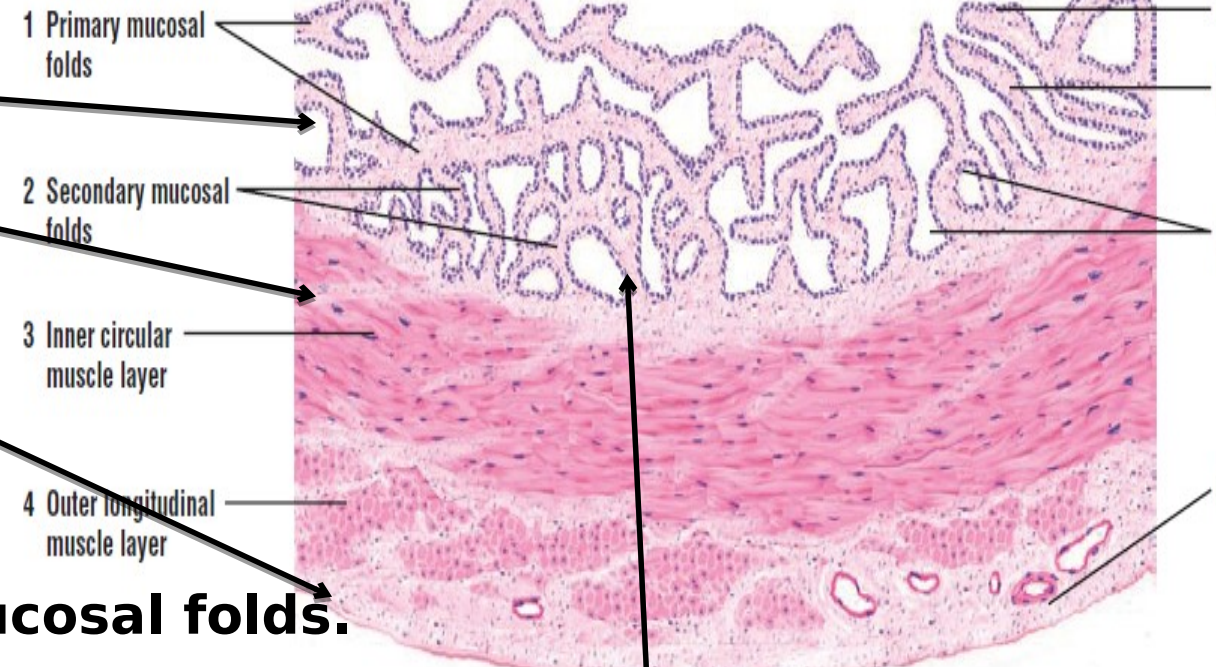
**1- Mucosa:**

thin complex folds that fill the lumen

Cross section of the gland shows **primary mucosal folds**.

branch into numerous **2<sup>ry</sup> mucosal folds**, which anastomose & form irregular cavities.

**Lamina propria** forms the core of the larger primary folds and the smaller secondary





# Seminal vesicles



-lined by: **pseudostratified** columnar epithelium.

low columnar cells have **short microvilli**, RER, Golgi complex, numerous mitochondria, some lipid droplets, lipochrome pigment.

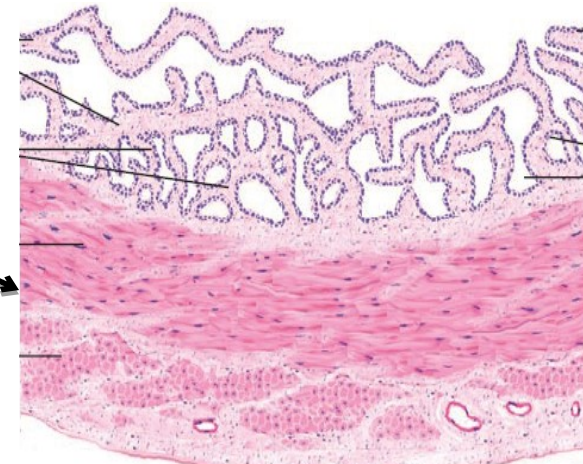
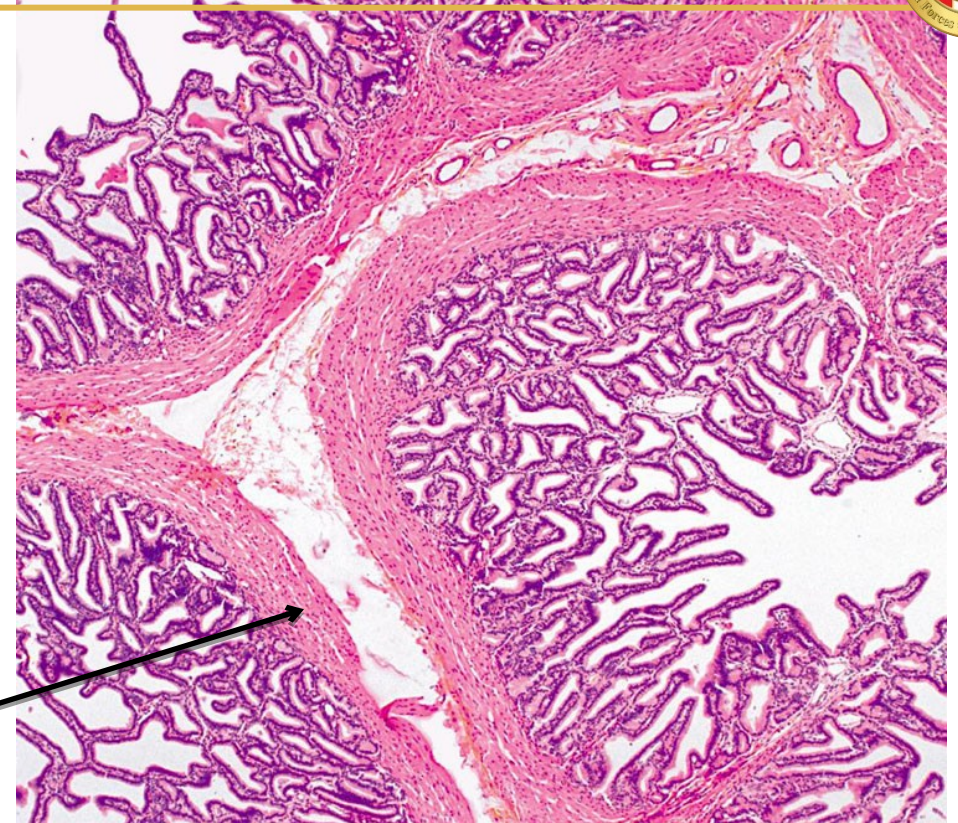
**Lamina propria: fibroelastic C.T**

2- **Muscle layer:**

**inner circular, outer longitudinal** smooth muscle layers. which empty the gland into the ejaculatory ducts during ejaculation

3- **Adventitia:**

formed of fibroelastic C.T.





# Seminal vesicles



**Functions** of seminal vesicles:

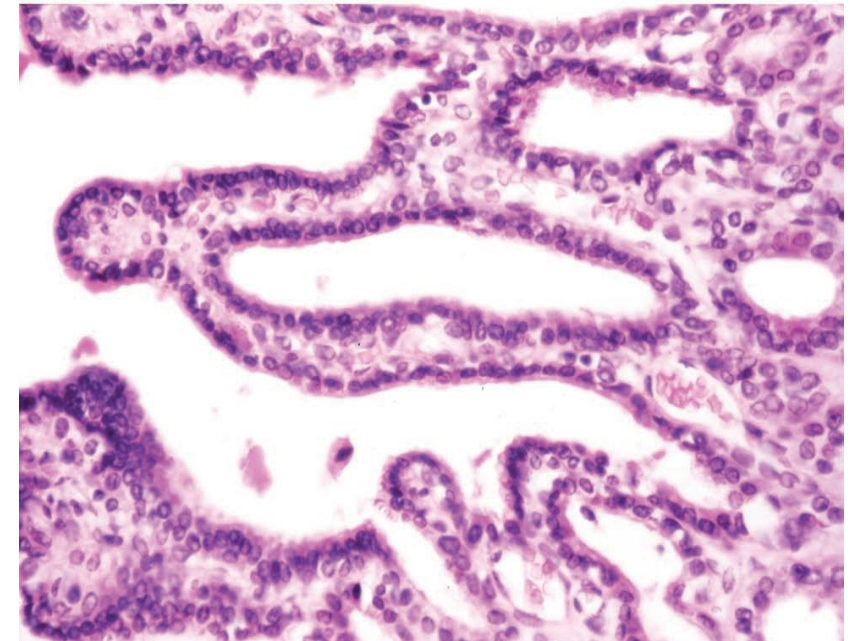
secrete a **viscous yellow** fluid which forms about 70% of the ejaculate.

The secretion is rich in

**a-Fructose** which is the main **nutrient** for spermatozoa and is a source of **energy** needed for their motility.

**b-Prostaglandins** which stimulate activity in the female reproductive tract

**C-Fibrinogens**





# Prostate gland



-The **largest** accessory gland.  
surrounds the urethra below the bladder  
It is **pierced by the urethra** and the **ejaculatory ducts**.

Prostatic urethra is **V-shaped** with its apex directed anteriorly. The 2 poster-lateral limbs of the **V-shaped** urethra are called the urethral sinuses.

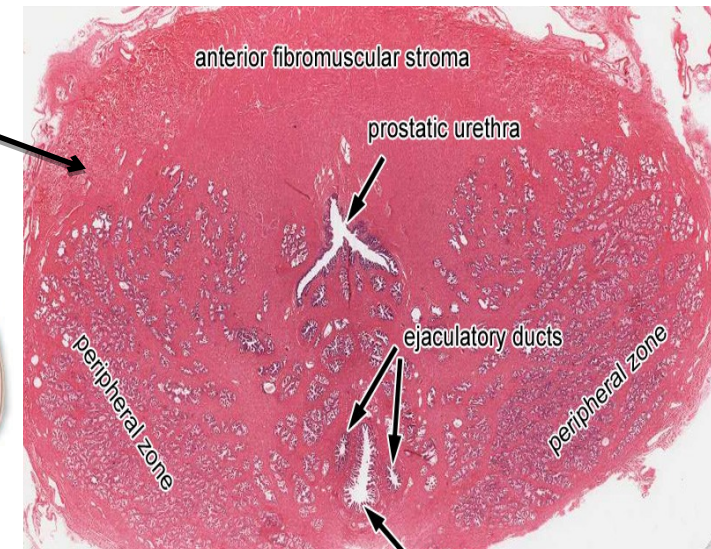
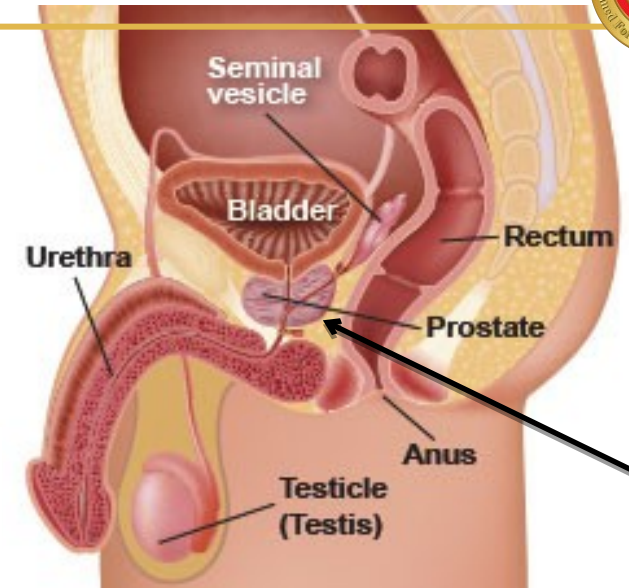
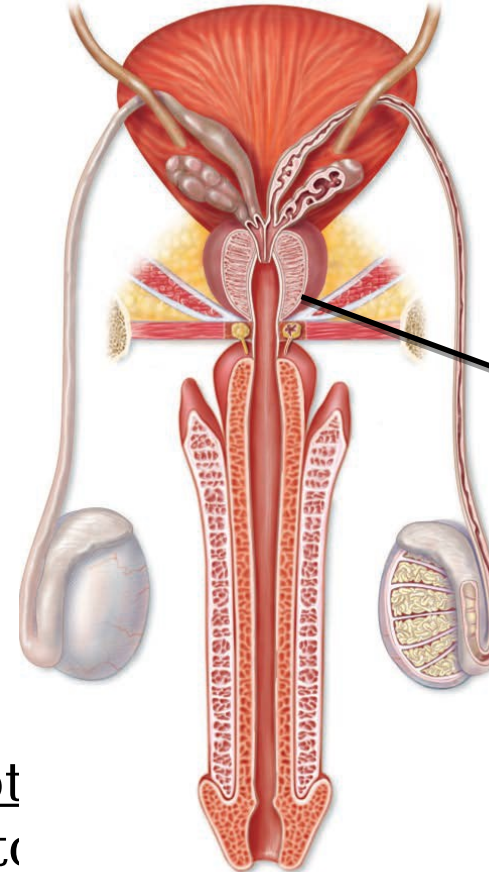
Prostate gland is formed of

**Stroma**

**Parenchyma**

1- **Capsule**: fibroelastic C.T. and contains smooth muscle fibers.

2- **Septa**: fibroelastic C.T. containing smooth muscle fibers. divide the prostatic gland into



# Prostate gland



## Parenchyma

Prostatic glands (tubuloacini) arranged in 3 concentric layers surrounding the prostatic urethra.

So there are **3 major zones**:

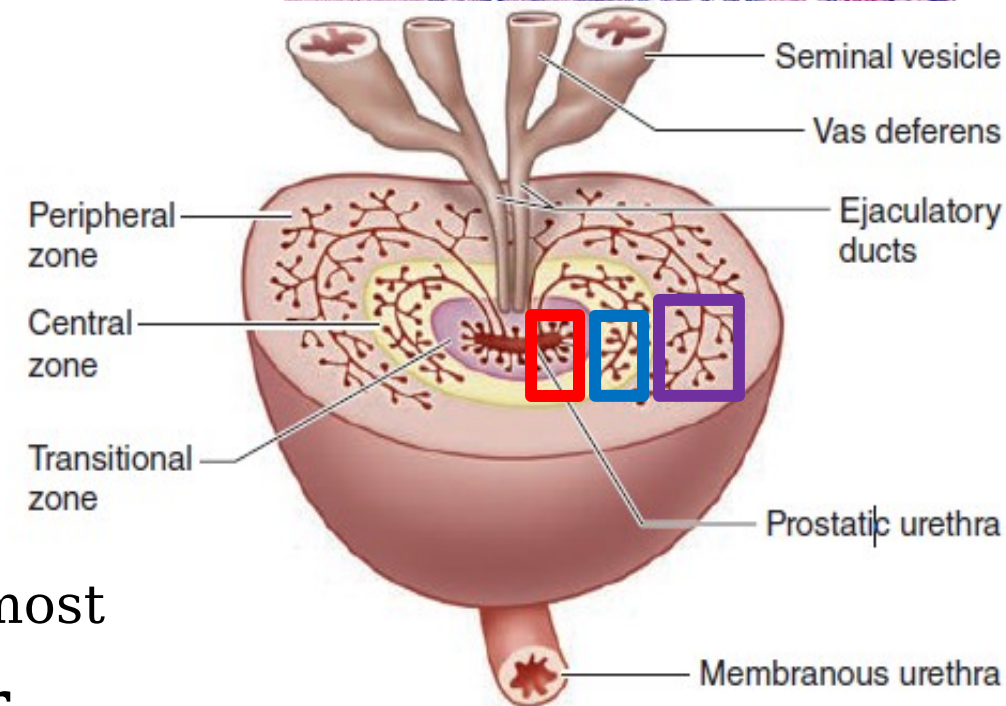
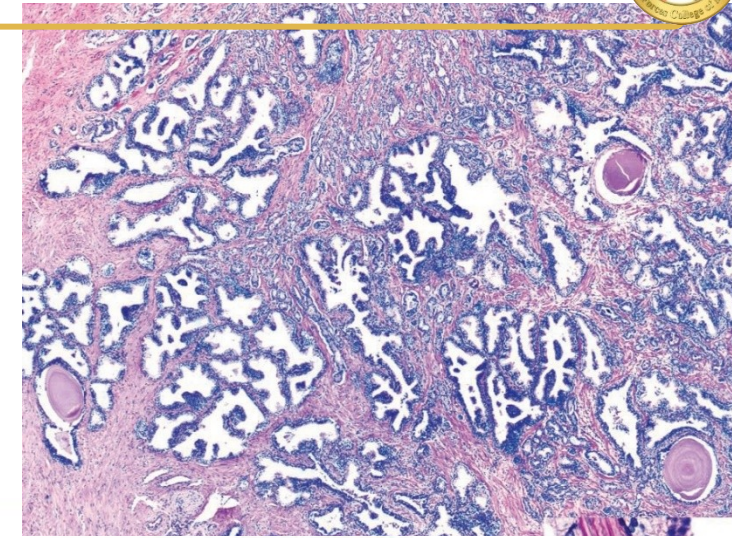
1- **Transition zone** (5%) (periurethral mucosal glands): lie in the that surround the superior portion of urethra.

**smallest acini**

2- **Central zone** (submucous glands): in the intermediate (25%). with longer ducts.

3- **Peripheral zone** (Main glands) (70% of the prostate). They are most **peripheral**, the **largest**, most **numerous**, with the **longest ducts**.

**Lining** of prostatic glands: **simple columnar or pseudostratified columnar ep.**





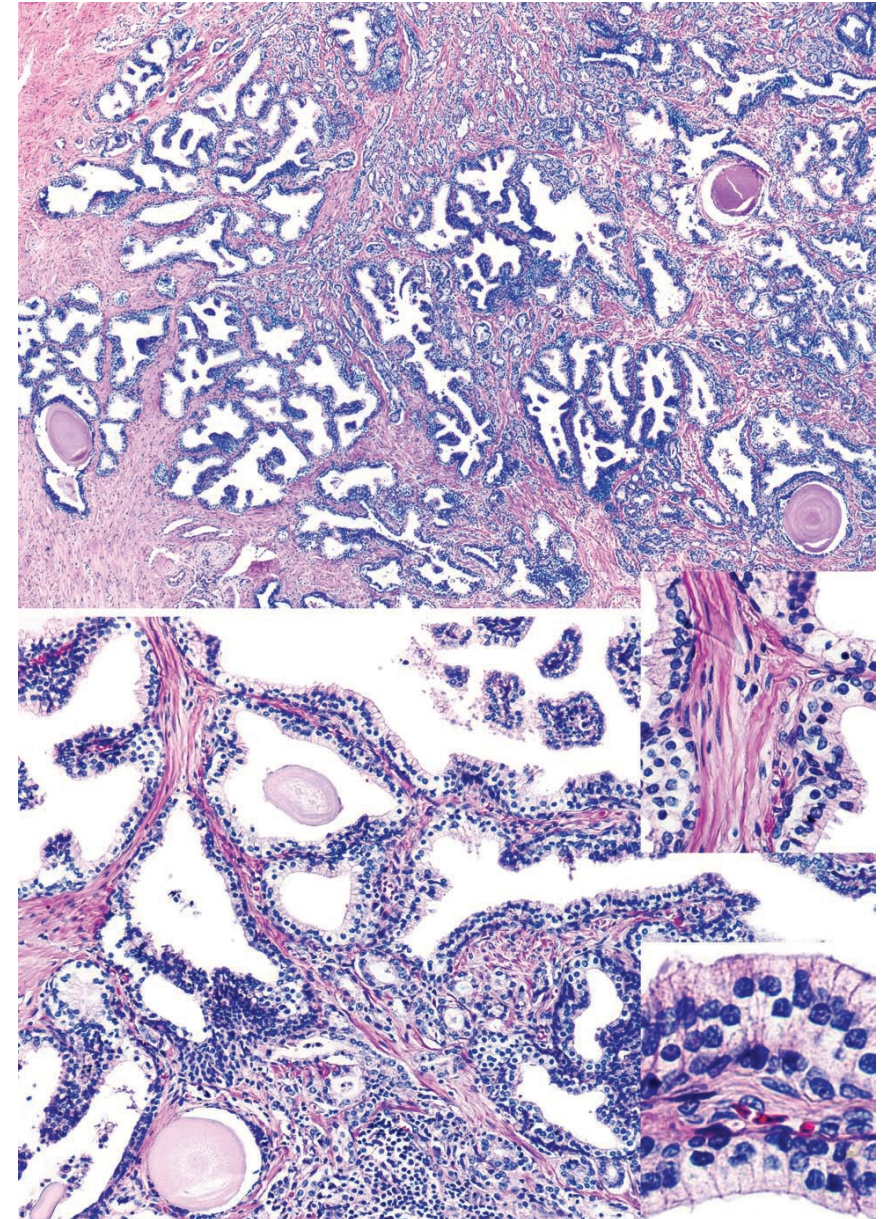
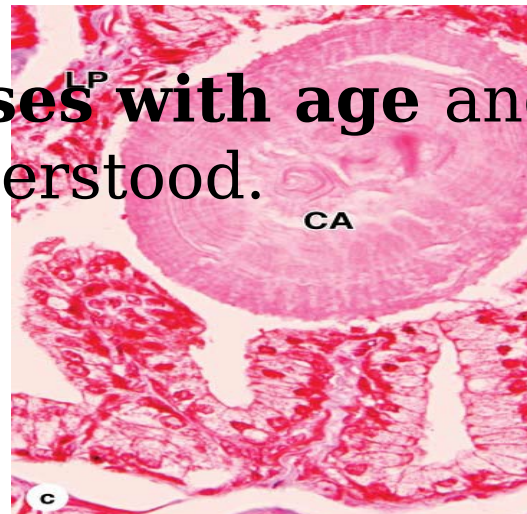
# Prostate gland



Lumina of prostatic acini frequently contain small spherical concretions called corpora amylacea.

They are bodies of deposited glycoproteins and keratan sulfate....often **partially calcified**.

-Their number **increases**<sup>LP</sup> **with age** and their significance is not understood.



# Prostate gland



EM:

Features of protein synthesizing cells i.e. abundant RER, a well-developed Golgi complex, numerous secretory granules.

**Function** of the prostate:

Secretion of **thin milky** fluid rich in **exosomes, glycoproteins, enzymes and small molecules such as prostaglandins**

Prostate-specific antigen (**PSA**) (a serine protease)

increased PSA indicate abnormal glandular mucosa typically due to prostatic carcinoma or inflammation)

<sup>NB</sup> Synthesis and secretion of prostatic secretions **depend on testosterone.**

Clinical application:

1- As **men age**, the prostatic **mucosal and submucosal glands** begin to enlarge causing **benign prostatic hypertrophy** resulting in difficulties with urination.

2- Malignant prostatic tumour is the second common cancer in men



1 Prostatic urethra

6 Transitional epithelium

2 Prostatic sinuses

7 Colliculus seminalis

8 Utricle

3 Ejaculatory ducts

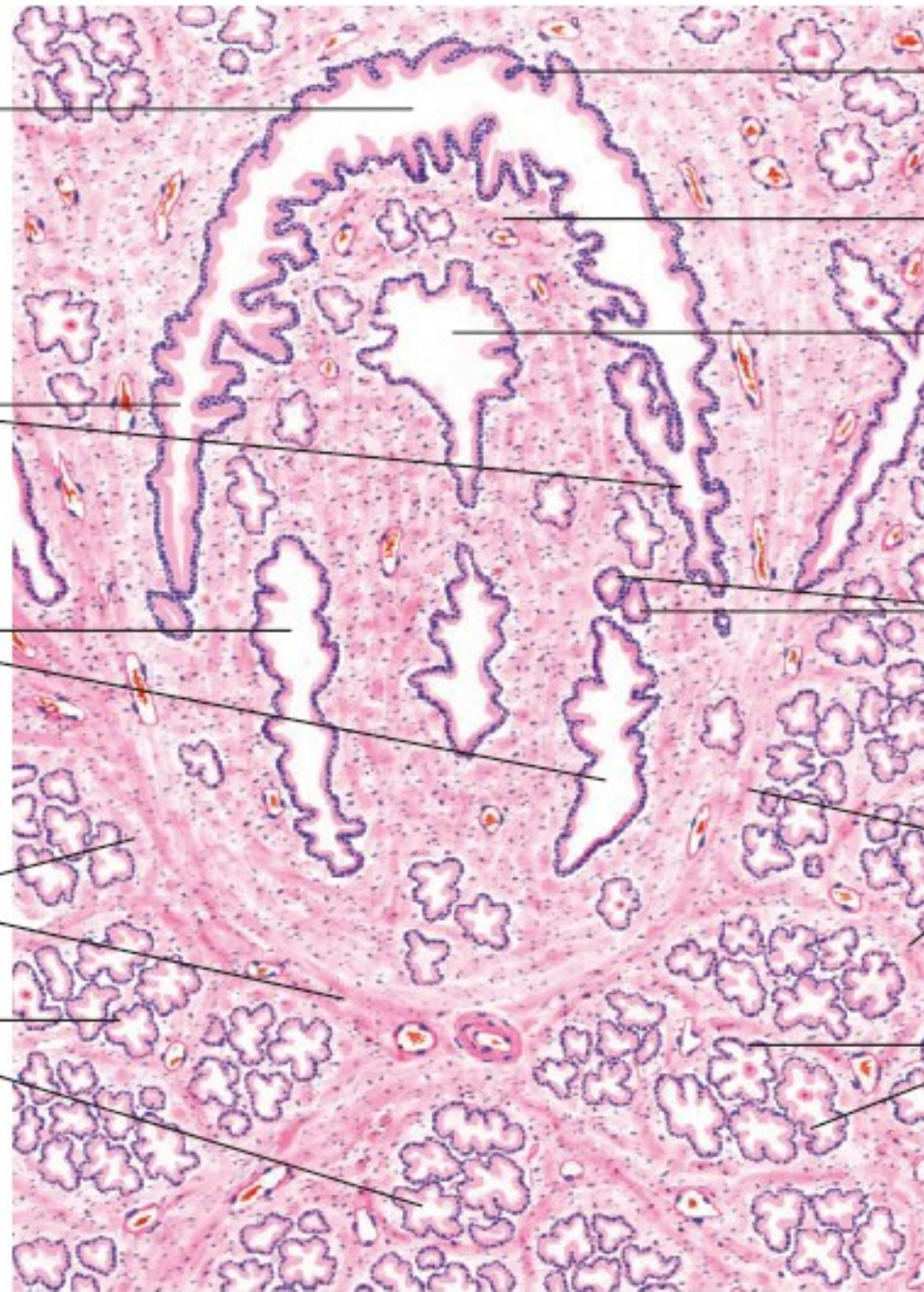
9 Ducts of prostatic glands

4 Smooth muscle bundles

10 Fibromuscular stroma

5 Prostatic glands

11 Prostatic glands with concretions



**FIGURE 18.10** ■ Prostate gland and prostatic urethra. Stain: hematoxylin and eosin. Low magnification.



# Bulbo-urethral (Cowper's) gland



Number: **2**

Size: small (3-5mm in diameter)

Site: present in urogenital diaphragm, empty in proximal penile urethra

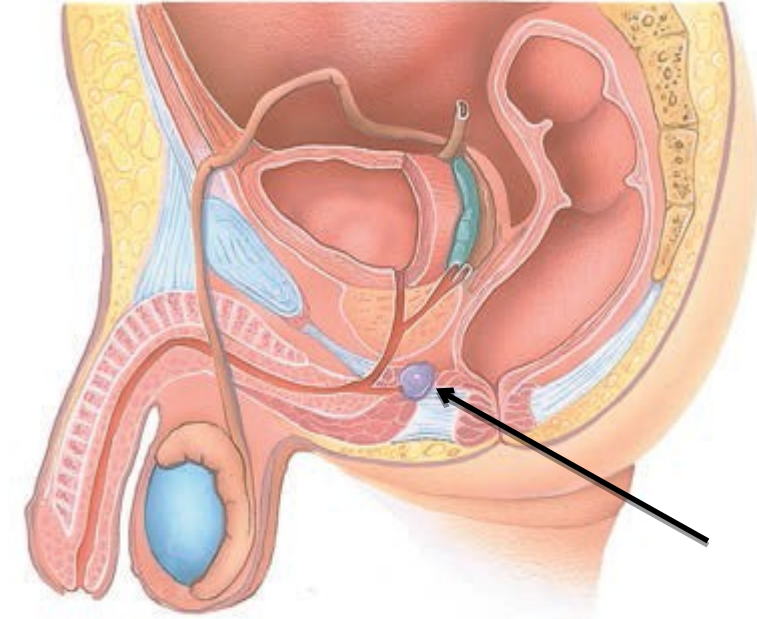
Glands are **tubule-alveolar** glands, lined by simple cuboidal to simple columnar **mucus secreting cells**

**Surrounded by smooth muscle**

Testosterone dependent

-Function:

Cowper's glands secrete a **viscous mucous** fluid containing galactose and sialic acid to lubricates the lumen of the urethra for passage of the ejaculate.



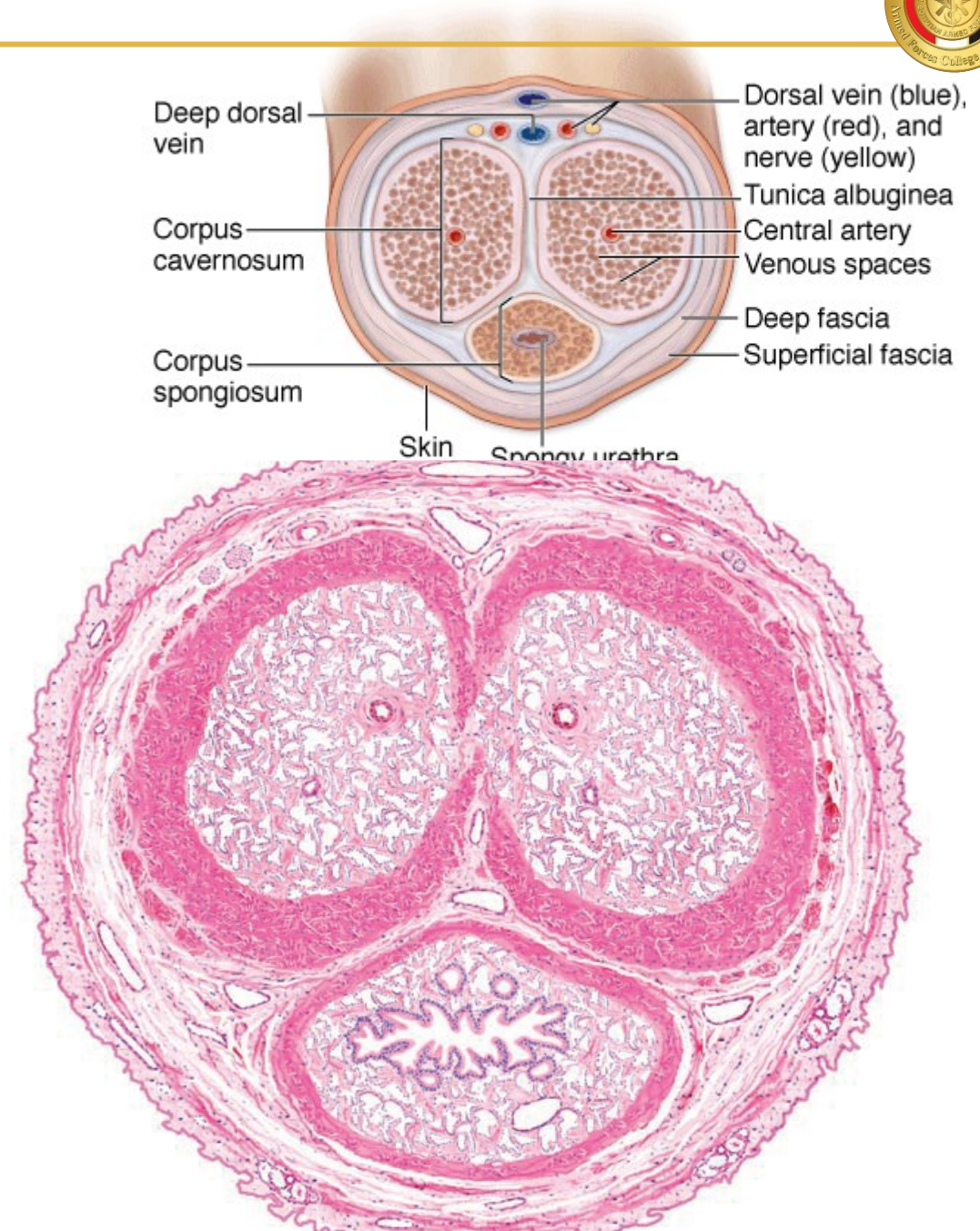
# Penis



The penis is surrounded by **thin skin**:

**a-**is hairy only at the root of the penis  
**no subcutaneous fat** to allow the **free movement** of the skin during copulation

Loose C.T. (facia penis) is present outside the **tunica albuginea** containing many elastic fiber and dorsally a superficial vein a deep vein and 2 dorsal arteries.





# Penis



Penis has **3 columns of erectile tissue**

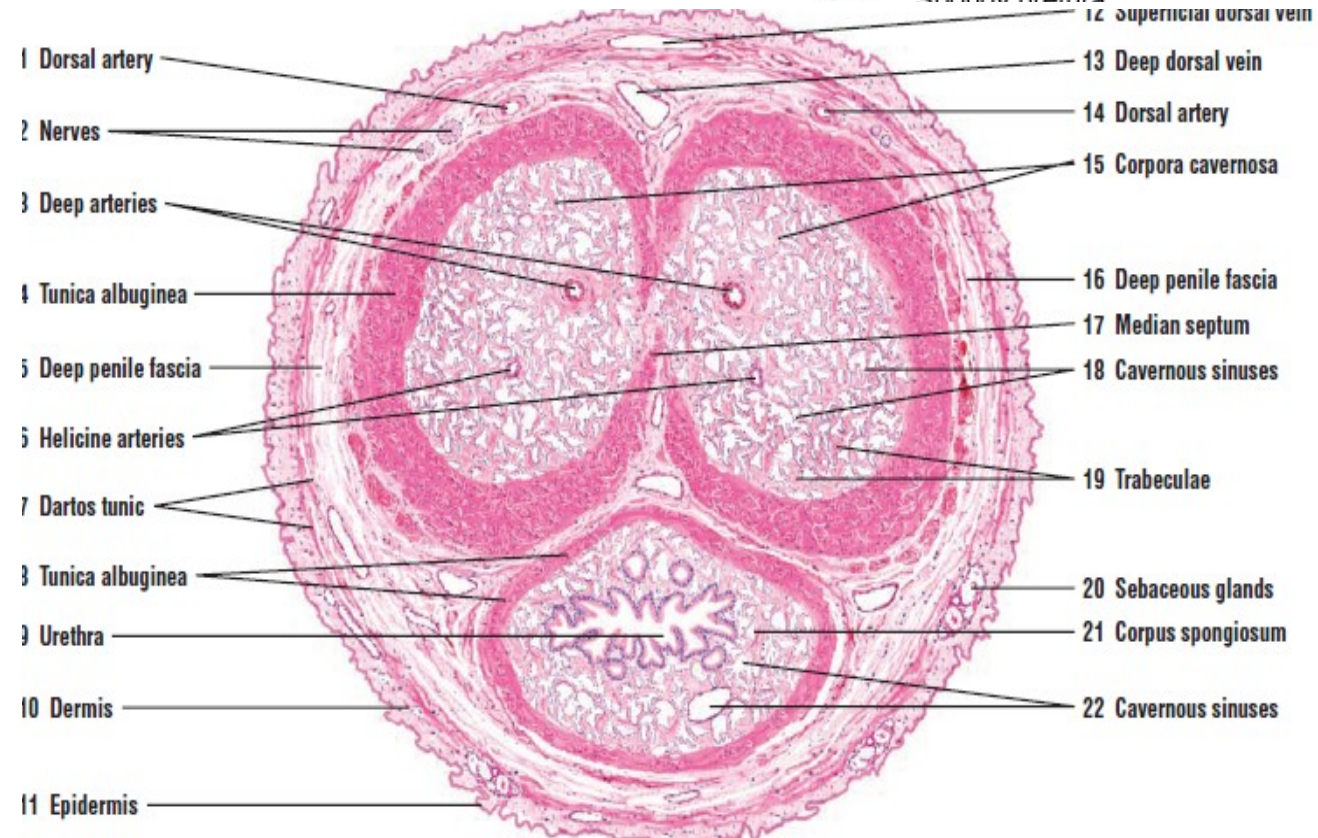
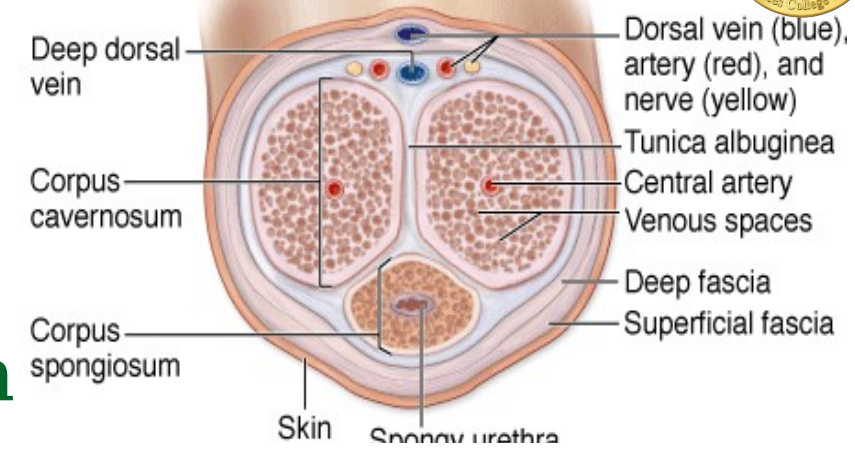
2

1

**Corpora cavernosa**

**Corpus spongiosum**

Each contain erectile tissue and is enclosed by its own dense fibrous C.T. capsule, the **tunica albuginea**.





# Penis



## Two corpora cavernosa:

their tunica albuginea are discontinuous in places permitting continuity between their erectile tissue

## One corpus spongiosum:

-It contains the **penile portion of the urethra** whose terminal part forms the fossa navicularis.

-corpus spongiosum expands at the end of penis forming the **glans**

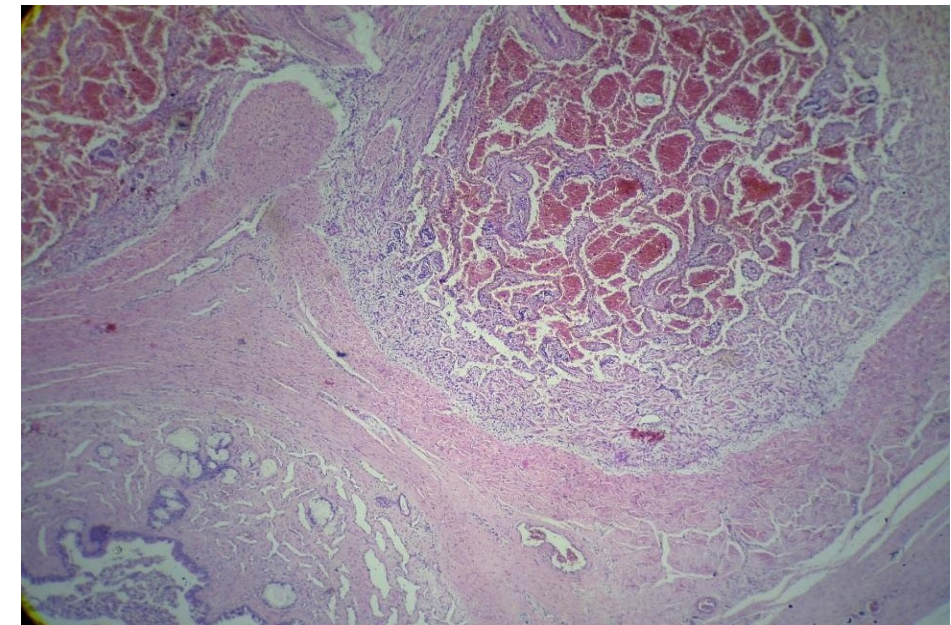
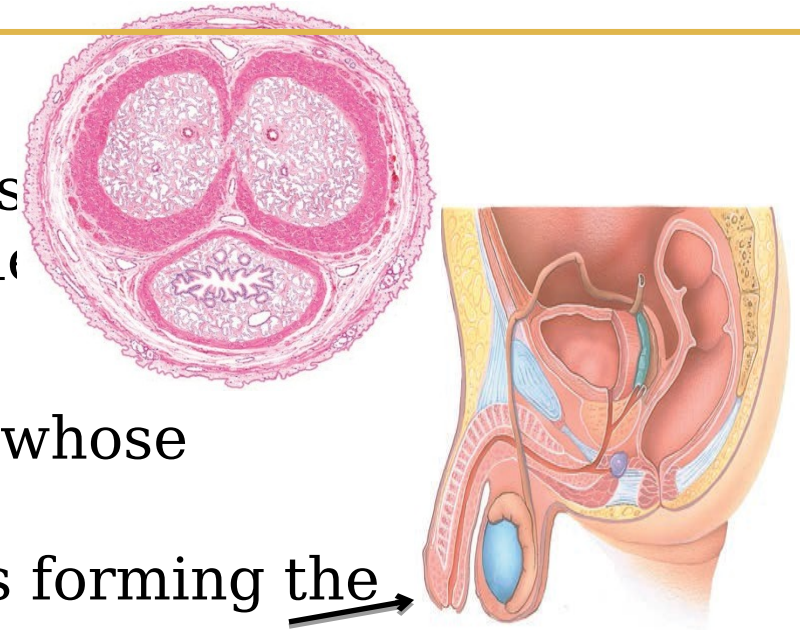
**Erectile tissue** is formed of:

Many **venous cavernous spaces** (sponge-like) that are

-lined with **endothelium**

-separated by fibrous trabeculae containing **smooth muscle fibers**.

Penile **erection** involves blood filling the cavernous spaces in the three masses of



# Penis

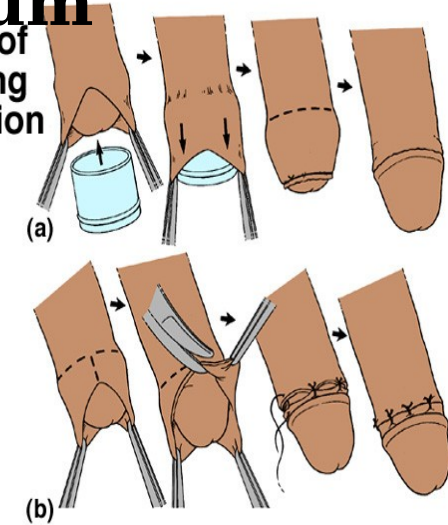


**Penile urethra** is lined by:  
mostly **pseudostratified columnar epithelium**  
the **glans**, it becomes **stratified squamous epithelium**

## Prepuce:

- is a **retractable fold of skin** around the glans penis
- contains glands of Tyson (modified sebaceous glands).
- It is removed during circumcision

Methods of  
Performing  
Circumcision



# Lining epi. of different parts through which sperms pass

	Lining Epithelium	Smooth
Seminiferous tubule	Spermatogenic cells, Sertoli cells	
Straight tubules (Tubuli Recti)	First half by Sertoli cells only Second half simple cubical epi	No
Rete testis	Cuboidal epi	No
Ductuli efferentes	Simple columnar ciliated alternating with cuboidal non-ciliated	Present
Ductus epididymis	Pseudo-stratified columnar ciliated epi. 2 types: basal & principal (stereocilia)	Present
Vas deference	Pseudo-stratified columnar ciliated epi. (sparse stereocilia)	Present
Ejaculatory duct	Simple columnar	No
Urethra: ➤ Prostatic ➤ Membranous ➤ Penile Fossa navicularis	Transitional Stratified col & pseudo-stratified col Stratified columnar Stratified squamous non-keratinized	Present as Internal urethral sphincter



# Lecture Quiz



## **Give reasons for**

- 1- Secondary spermatocytes are rarely seen in the section
- 2- Cytoplasmic intercellular bridges between developing spermatogenic cells
- 3- Irregularity of the lateral surface of Sertoli cells
- 4- Abundant cytoskeleton in Sertoli cells
- 5- Secondary spermatocyte contain 23 d-chromosomes
- 6- Chromosomes in the cells of secondary spermatocytes are not identical
- 7- concretions are seen in prostatic acini
- 8- prostate enlargement result in urinary problems

# Lecture Quiz



**As sperm pass through the male genital ducts, proteins and low-molecular-weight products are added from several sources producing semen. Which of the following provides a nutritive, fructose-rich secretion?**

- a. Interstitial cells of Leydig
- b. Bulbourethral (Cowper) glands
- c. Prostate gland
- d. Epididymis
- e. Seminal vesicles

**Within the male reproductive tract, stereocilia project from cells lining which of the following regions?**

- a. Rete testis
- b. Seminiferous tubules
- c. Ampulla of the ductus deferens
- d. Epididymis
- e. Penile urethra



## **SUGGESTED TEXTBOOKS**



- 1. Junqueira`s Basic Histology; Text and Atlas. 15<sup>th</sup> edition 2018.**
- 2. Histology A Text and Atlas: Michael H. Ross and Wojciech Pawlina, 7<sup>th</sup> edition, 2016.**



Thank  
you

